

What Is Claimed Is:

1. A mold clamping unit which is used in a molding apparatus and serves to open and close a mold having a movable mold plate and a fixed mold plate, said mold  
5 clamping unit comprising:

a mold clamping cylinder driven by supply or discharge of a working fluid, said mold clamping cylinder for moving said movable mold plate between a fully open position in which said movable mold plate is separated by  
10 a predetermined distance from said fixed mold plate and a closed position in which said movable mold plate is in contact with said fixed plate;

mold opening means for applying a mold opening force of a predetermined magnitude to said movable mold plate  
15 in the direction from said closed position toward said fully open position and moving said movable mold plate from said closed position to a predetermined half-open position located between said closed position and said fully open position;

20 switching means for switching a mold clamping force generated by said mold clamping cylinder between a first mold clamping force which is larger than said mold opening force and a second mold clamping force which is smaller than said mold opening force by switching the supply  
25 pressure of the working fluid supplied to said mold clamping cylinder; and

control means for controlling said mold opening means and said switching means.

2. The mold clamping unit according to claim 1, wherein said control means controls said switching means so that said mold clamping force becomes said first mold clamping force for moving said movable mold plate to said closed position.

3. The mold clamping unit according to claim 1, wherein said control means controls said mold opening means and also controls said switching means so that said mold clamping force becomes said second mold clamping force, for moving said movable mold plate from said closed position to said half-open position.

4. The mold clamping unit according to claim 1, wherein said control means controls said mold opening means and also controls said switching means so that said mold clamping force becomes said second mold clamping force for moving said movable mold plate from said closed position to said half-open position, and after said movable mold plate has been moved to said half-open position, said control means controls said switching means so that said mold clamping force becomes said first mold clamping force, for moving said movable mold plate toward said closed position.

5. The mold clamping unit according to claim 1, comprising a mounting stand on which said fixed mold plate

is mounted and a mounting plate on which said movable mold plate is mounted, wherein said mold opening means comprises an extension and contraction mechanism which is disposed between said mounting stand and said mounting plate and  
5 can extend and contract along the mold clamping direction, a drive source for driving said extension and contraction mechanism, and stop means for stopping the extension and contraction motion of said extension and contraction mechanism when said movable mold plate has been moved from  
10 said closed position to said half-open position.

6. The mold clamping unit according to claim 5, wherein said extension and contraction mechanism is a hydraulic cylinder; said drive source is a hydraulic pump supplying a working fluid to said hydraulic cylinder; and  
15 said stop means is an end portion on the rod side of a cylinder tube which is brought in contact with the piston when said hydraulic cylinder extends.

7. The mold clamping unit according to claim 5, comprising a position adjusting tool, disposed between said  
20 extension and contraction mechanism and said mounting stand, for adjusting the position of said extension and contraction mechanism in the mold clamping direction.

8. The mold clamping unit according to claim 7, wherein said position adjusting tool comprises a first  
25 block having a first surface and a second surface on the side opposite to the first surface and a second block having

a third surface that is slidably in contact with said second surface of said first block and a fourth surface on the side opposite to the third surface and has a configuration, with respect to said first and second blocks, such that  
5 the spacing between said first surface and said fourth surface can be adjusted by the mutual wedge effect of said first block and said second block.

9. The clamp molding unit according to claim 1, wherein said molding apparatus is an injection molding  
10 apparatus.

10. An injection molding apparatus comprising:  
a mold having a fixed mold plate and a movable mold plate;  
an injector for injecting a plasticized resin into  
15 a cavity of said mold closed; and  
a mold clamping unit for opening and closing said mold,

wherein said mold clamping unit comprises:  
a mold clamping cylinder which is driven by  
20 supply or discharge of a working fluid, and moves said movable mold plate between a fully open position in which said movable mold plate is separated by a predetermined distance from said fixed mold plate and a closed position in which said movable mold plate is in contact with said  
25 fixed plate;

mold opening means for applying a mold opening

force of a predetermined magnitude to said movable mold plate in the direction from said closed position toward said fully open position and moving said movable mold plate from said closed position to a predetermined half-open position located between said closed position and said fully open position;

switching means for switching a mold clamping force generated by said mold clamping cylinder between a first mold clamping force which is larger than said mold opening force and a second mold clamping force which is smaller than said mold opening force by switching the supply pressure of said working fluid supplied to said mold clamping cylinder; and

control means for controlling said mold opening means and said switching means.

11. The injection molding apparatus according to claim 10, wherein said control means controls said switching means so that said mold clamping force becomes said first mold clamping force for moving said movable mold plate to said closed position.

12. The injection molding apparatus according to claim 10, wherein said control means controls said mold opening means and also controls said switching means so that said mold clamping force becomes said second mold clamping force, for moving said movable mold plate from said closed position to said half-open position.

13. The injection molding apparatus according to claim 10, wherein said control means controls said mold opening means and also controls said switching means so that said mold clamping force becomes said second mold clamping force, for moving said movable mold plate from said closed position to said half-open position, and after said movable mold plate has been moved to said half-open position, said control means controls said switching means so that said mold clamping force becomes said first mold clamping force, for moving said movable mold plate toward said closed position.

14. The injection molding apparatus according to claim 10, comprising a mounting stand on which said fixed mold plate is mounted and an mounting plate on which said movable mold plate is mounted, wherein said mold opening means comprises an extension and contraction mechanism which is disposed between said mounting stand and said mounting plate and can extend and contract along the mold clamping direction, a drive source for driving said extension and contraction mechanism, and stop means for stopping the extension and contraction motion of said extension and contraction mechanism when said movable mold plate has been moved from said closed position to said half-open position.

15. The injection molding apparatus according to claim 14, wherein said extension and contraction mechanism

is a hydraulic cylinder; said drive source is a hydraulic pump supplying a working fluid to said hydraulic cylinder; and said stop means is an end portion on the rod side of a cylinder tube which is brought in contact with the piston  
5 when said hydraulic cylinder extends.

16. The injection molding apparatus according to claim 14, comprising a position adjusting tool, disposed between said extension and contraction mechanism and said mounting stand, for adjusting tool the position of said  
10 extension and contraction mechanism in the mold clamping direction.

17. The injection molding apparatus according to claim 16, wherein said position adjusting tool comprises a first block having a first surface and a second surface  
15 on the side opposite to the first surface and a second block having a third surface that is slidably in contact with said second surface of said first block and a fourth surface on the side opposite to the third surface and has a configuration, with respect to said first and second blocks,  
20 such that the spacing between said first surface and said fourth surface can be adjusted by the mutual wedge effect of said first block and said second block.